

REMARKS

Claims 1-61 are pending in the present application. In the above amendments, claims 1, 5, 10, 11, 15, 18, 19, 23, 26, 27, 29, 30, 34, 36, 39, 41, 45, 46, 48, 50, 54, 55, 57, 59 and 61 have been amended to further clarify the invention. Applicant respectfully responds to this Office Action.

Allowable Subject Matter

Applicant gratefully acknowledges the notification of allowable subject matter in claims 5, 6, 15, 23 and 29.

Claim Rejections – 35 USC § 103

Claims 1-4, 7-14, 16-22, 24-28 and 30-61 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Owens et al. (US Patent No. 5,481,611), in view of Bolin et al. (US Patent Publication No. 2005/0047514).

The Office has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art references must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

Claims 1, 11, 19, 27, 30, 41, 50 and 59

Claims 1, 11, 19 and 27 – encoding the access code into acoustic sound waves using multicarrier modulation.

As to independent claims 1, 11, 19 and 27, the Office Action cites Owens as teaching the claimed invention except for “*the converter encoding the access code into acoustic sound waves using multicarrier modulation.*” The Office Action alleges that Bolinth teaches a multi-carrier modulator or demodulator of the transmit and receive device, wherein the signal (access code) is converted into sound waves using multi-carrier modulation.

Applicant traverses this rejection in its entirety.

Claimed Elements are Not Taught by the Prior Art

The Office has the burden to show that the prior art included each claimed element. Applicant submits that Owens and Bolinth, either alone or in combination, fail to teach the claimed subject matter of an apparatus, method and machine readable medium for requesting authentication by converting “*the access code into acoustic sound waves encoded with the access code . . . using multicarrier modulation*”.

The present application provides a system for digital authentication over an acoustic channel. A method and apparatus controls access to a secure network by requesting authenticating by generating an access code using a cryptographic key. The access code is then converted into acoustic sound waves (i.e., acoustic signals *which are analog signals*) using multicarrier modulation. The acoustic sound waves encoded with the access code are then output using an audio output device for authentication. (See paragraphs [0044] and [0059])

Furthermore, as described in paragraph [0060] of the present application, a first conversion unit 600 encodes the digital data into outgoing multiple sound wave carriers. The code symbols are *modulated into multiple audio wave carriers* by digital modulator 640 and inverse fast fourier transformed by IFFT element 650 to generate *analog signals*, called MC symbols. *The MC symbols are then up converted by up-converter 660 for output as audio waves encoded with digital data through audio output unit.*” In other words, data is being transmitted

and output in the form of acoustic sound waves (i.e. analog signals) and not in the form of digital signals as in Owens.

The Office Action admits that Owens does not teach converting “the access code into sound waves encoded with the access code . . . using multicarrier modulation”. The Office Action relies on Bolinth (paragraphs [0018 – 0030]) as teaching “a multi-carrier modulator or demodulator of the transmit and receive devices, wherein the signal (access code) is converted into acoustic sound waves using multi-carrier modulation.” However, Bolinth merely teaches a “transmit and receive device for improved data transfer in a wireless multi-carrier system, wherein a so-called OFDM modulation (Orthogonal Frequency Division Multiplexing) is used as a *multiplexing or multi-carrier modulation* method.” (See Bolinth paragraph [0020]) OFDM is used for obtaining high-speed *digital data transmission* over a telephone wire and is not an acoustic sound signal as claimed. In particular, OFDM transmissions do not involve “sound signals” that are transmitted acoustically. Consequently, the cited prior art fails to teach the limitations as claimed.

No Motivation to Combine Cited References

Assuming, *arguendo*, that every claimed element is taught by the prior art, Applicant further submits that there is no motivation to combine Owens and Bolinth as alleged in the Office Action.

The Office has the burden to show that one of ordinary skill in the art could have combined the elements claimed by known methods, and that in combination, each element would have merely performed the same function as it did separately. "In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

The Office Action notes that the motivation for combining the teachings of Owens with Bolinth is “for encoding the access code into acoustic sound waves using multi-carrier modulation to provide improved ways to transfer data (access code) and provide efficient ways

to recover access code as suggested by Bolinth (see Bolinth paragraph [0014]).” A careful review of Bolinth reveals that it fails to disclose, teach or suggest any method for securing information against unauthorized access, i.e. does not teach disclose or suggest authenticating data. What Bolinth teaches is parallel concatenated encoding and modulation in an electromagnetic communication system using an orthogonal frequency division multiplexing (OFDM) as a multi-carrier modulation. OFDM is used for obtaining high-speed *digital data transmission* over conventional telephone lines and not for authenticating data. As such, there is no motivation to combine the unrelated teachings of Bolinth with those of Owens. The use of encoding an access code into acoustic sound waves using multicarrier modulation is novel over the cited prior art.

No Reasonable Expectation of Success

Owens describes a cryptography-based entity authentication device that encrypts a random digital sequence using DTMF tones and sends it to a host facility for authentication. Bolinth describes parallel concatenated encoding and modulation in an electromagnetic communication system using an orthogonal frequency division multiplexing (OFDM) as a multi-carrier modulation. (See paragraphs [0020] and [0026]). Orthogonal frequency-division multiplexing (OFDM) is a method of *digital modulation* in which a signal is split into several narrowband channels at different frequencies. Furthermore, it is a method of obtaining high-speed *digital data transmission* over conventional telephone lines. As OFDM is a method of digital modulation and not encoding data into acoustic sound waves modulates *digital data* it cannot modulate acoustic sound waves as in the claimed invention.

Using OFDM as a method of *digital modulation* in which a signal is split into several narrowband channels at different frequencies for transmission is not interchangeable with encrypting a random digital sequence using DTMF tones and sending it to a host facility for authentication as in Owens and is therefore not a simple combination of the cited prior art references. In fact, the claimed invention is significantly more complex than the mere use of DTMF tones described by Owens. Consequently, Applicant submits that, based on the cited prior art, there is no reasonable expectation of success in making the claimed combination.

Claims 30, 41, 50 and 59 – *receiving acoustic sound waves encoded with an access code using multicarrier modulation.*

As to independent claims 30, 41, 50 and 59, the Office Action cited Owens as teaching the claimed invention except for receiving “*sound waves encoded with an access code using multicarrier modulation.*” The Office Action alleges that Bolinith teaches a multi-carrier modulator or demodulator of the transmit and receive device, wherein the signal (access code) is converted into acoustic sound waves using multi-carrier modulation.

Applicant traverses this rejection in its entirety.

Claimed Elements are Not Taught by the Prior Art

The Office has the burden to show that the prior art included each claimed element. Applicant submits that Owens and Bolinith, either alone or in combination, fail to teach the claimed subject matter of an apparatus, method and machine readable medium for authenticating by receiving “*the access code into acoustic sound waves encoded with the access code . . . using multicarrier modulation*”.

The Office Action admits that Owens does not teach receiving “*sound waves encoded with an access code using multicarrier modulation.*” The Office Action relies on Bolinith (paragraphs [0018 – 0030]) as teaching “a multi-carrier modulator or demodulator of the transmit and receive devices, wherein the signal (access code) is converted into acoustic sound waves using multi-carrier modulation.” Bolinith merely teaches a “transmit and receive device for improved data transfer in a wireless multi-carrier system, wherein a so-called OFDM modulation (Orthogonal Frequency Division Multiplexing) is used as a *multiplexing or multi-carrier modulation* method.” (See Bolinith paragraph [0020]) OFDM is used for obtaining high-speed *digital data transmission* and is not an acoustic sound signal as claimed. In particular, OFDM transmissions do not involve “sound signals” that are transmitted acoustically. Consequently, the cited prior art fails to teach the limitations as claimed.

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Assuming, *arguendo*, that every claimed element is taught by the prior art, Applicant further submits that there is no motivation to combine Owens and Bolinth as alleged in the Office Action.

The Office has the burden to show that one of ordinary skill in the art could have combined the elements claimed by known methods, and that in combination, each element would have merely performed the same function as it did separately. "In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

The Office Action notes that the motivation for combining the teachings of Owens with Bolinth is "for encoding the access code into acoustic sound waves using multi-carrier modulation to provide improved ways to transfer data (access code) and provide efficient ways to recover access code as suggested by Bolinth (see Bolinth paragraph [0014])." As described above, a careful review of Bolinth reveals that it fails to disclose, teach or suggest any method for securing information against unauthorized access, i.e. does not teach disclose or suggest authenticating data. What Bolinth teaches is parallel concatenated encoding and modulation in an electromagnetic communication system using an orthogonal frequency division multiplexing (OFDM) as a multi-carrier modulation. OFDM is used for obtaining high-speed *digital data transmission* over a telephone wire and not for authenticating data. As such, there is no motivation to combine the unrelated teachings of Bolinth with those of Owens. The use of encoding an access code into acoustic sound waves using multicarrier modulation is novel over the cited prior art.

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(OFDM) as a multi-carrier modulation. (See paragraphs [0020] and [0026]) Orthogonal frequency-division multiplexing (OFDM) is a method of *digital modulation* in which a signal is split into several narrowband channels at different frequencies. Furthermore, it is a method of obtaining high-speed *digital data transmission* over conventional telephone lines. As OFDM is a method of digital modulation and not encoding data into acoustic sound waves modulates *digital data* it cannot modulate acoustic sound waves as in the claimed invention,

Using OFDM as a method of *digital modulation* in which a signal is split into several narrowband channels at different frequencies for transmission is not interchangeable with encrypting a random digital sequence using DTMF tones and sending it to a host facility for authentication as in Owens and is therefore not a simple combination of the cited prior art references. In fact, the claimed invention is significantly more complex than the mere use of DTMF tones described by Owens. Consequently, Applicant submits that, based on the cited prior art, there is no reasonable expectation of success in making the claimed combination.

Based on at least the foregoing reasons, Applicant respectfully submits that independent claims 1, 11, 19, 27, 30, 41, 50 and 59 are patentably distinguishable over the cited prior art. Therefore, Applicant respectfully requests allowance of independent claims 1, 11, 19, 27, 30, 41, 50 and 59.

Claims 10, 18, 26, 34, 36, 39, 45, 48, 54, 55, 57 and 61

Claims 10, 18, 26

As to dependent claims 10, 18, and 26, the Office Action cites Owens as teaching “the converter is configured to encode the password into sound waves” and “the audio output unit is configured to output the sound waves encoded with the password for authentication.” (See Owens Col. 9 line 61 – Col. 10 line 11) A careful review of this section of Owens merely indicates the use of passwords. It fails to disclose teach or suggest encoding the password into sound waves which are analog signals. As discussed above, Owens is directed to transmission of digital data and not acoustic sound waves (i.e. analog signals). Consequently, Owens fails to

teach the limitations of claims 10, 18, and 26. Applicant also submits that these claims are in condition for allowance due to their dependence on independent claims 1, 11, and 19.

Claims 34, 45, and 54

As to dependent claims 34, 45, and 54 the Office Action cites Owens as teaching receiving “sound waves encoded with a challenge”. (See Owens Col. 3 lines 31-50 and Col. 9 lines 1-55) A careful review of these sections of Owens merely indicates the use of a challenge. They fail to disclose teach or suggest receiving sound waves (which are analog signals) encoded with a challenge. As discussed above, Owens is directed to transmission of digital data and not acoustic sound waves (i.e. analog signals). Consequently, Owens fails to teach the limitations of claims 10, 18, and 26. Applicant also submits that these claims are in condition for allowance due to their dependence on independent claims 30, 41, and 50.

Claims 36, 39, 48, 55, 57 and 61

Dependent claims 36, 39, 48, 55, 57 and 61, all recite the limitation of sound waves in either transmitting receiving signals. As discussed above, Owens is directed to transmission of digital data and not acoustic sound waves (i.e. analog signals). Consequently, Owens fails to teach the limitations of claims 36, 39, 48, 55, 57 and 61. Applicant also submits that these claims are in condition for allowance due to their dependence on independent claims 30, 41, 50 and 59.

Claims 2-4, 7-9, 12-14, 16, 17, 21, 22, 24, 25, 28, 31-33, 35, 37, 38, 40, 42-44, 46, 47, 49, 51-53, 56, 58 and 60

As to dependent claims 2-4, 7-9, 12-14, 16, 17, 21, 22, 24, 25, 28, 31-33, 35, 37, 38, 40, 42-44, 46, 47, 49, 51-53, 56, 58 and 60 the Office Action also cites Owens as teaching the recited limitations. While Applicant disagrees the cited prior art teaches the limitations recited in these claims, this argument need not be reached since these dependent claims are in condition for allowance due to their dependence on independent claims 1, 11, 19, 27, 30, 41, 50 and 59.

Applicant has reviewed the references made of record and asserts that the pending claims are patentable over the references made of record.

In view of the above, therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of, and/or objection and allowance of claims 1-61.

Should any of the above rejections be maintained, Applicant respectfully requests that the noted limitations be identified in the cited references with sufficient specificity to allow Applicant to evaluate the merits of such rejections. In particular, rather than generally citing whole sections or columns, Applicant requests that the each claimed element be specifically identified in the prior art to permit evaluating the references.

CONCLUSION

In light of the amendments contained herein, Applicant submits that the application is in condition for allowance, for which early action is requested.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026. Applicant hereby petitions a two (2) month Extension of Time to be charged to Deposit Account No. 17-0026. Applicant also requests that any fees for the RCE be charged to Deposit Account No. 17-0026.

Respectfully submitted,

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